Deliverable D1.6

D1.6 Report of data inventory of meteorological stations per month to be considered for the service, including the specification of existing data gaps and proposed methodologies to fill them, and of existing analogue datasets to be digitized

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Content

Introduction

The deliverable D1.6 is closely linked to deliverables D1.9 Report on preliminary results of the data rescue and digitised exercise and D1.14 Implemented draft version of metadata per country of meteorological stations selected for this project, including the length of record and observed parameters per station. The detailed analyses of the individual variables spatial (temporal) distribution could help for Module 2 activities preparation.

1. Stations density requirements

Regarding the average density of the observation stations within the study region as defined in the Technical specification of the project, a minimum density of about 1 station in 25 km x 25 km for precipitation and about 1 station in 50 km x 50 km for air temperature shall be achieved. The remaining variables shall have a density of not less than about 1 station in 50 km x 50 km on the average. Lower average station densities for single parameters and/or for extended areas within the study region must be justified with evidence that no observations exist in this area. The minimum number of stations is in columns 4 and 5 in Tab. 1. It is presumed, that every climatological station is measuring also precipitation (column 6). In accordance with the Minutes of the 2nd meeting of CARPATCLIM project (Bratislava, Slovakia, 18-19 July, 2011) there was approved a number of stations +10% as recommended in the project specification (optimal number of stations) having balanced spatial data information. The summary of stations for every country (based on the country area size in CARPATCLIM area of interest) is in Table. 1 (columns 7, 8 and 9). The number of stations will be increased to involve the 50 km belt around area of interest of the project to assure correctness of data in borderline of Carpathian region. Every country will provide such a set of stations (data and metadata for its own territory and territory of non-participant of the project). These sets will be used for data homogenisation and creating individual country gridded datasets.

3. Stations inventory in CARPATCLIM region

The set of climatological and precipitation stations was suggested for individual countries with the regard to data availability in electronic data-base and/or the possibility to complete potential gaps in variables from paper archive or other sources by the time of using data for homogenisation, data harmonisation, data exchange and creating country gridded datasets as suggested in Module 2. Additional criteria as station representativeness (minimal microclimatology influences), quasi regularly area coverage and the altitude variety of the territory were taken into account as well. Number of stations of individual countries are in columns 10, 11 and 12 of Table 1.

3.1 Climatological stations

The number of climatological stations is sufficient from the overall density requirement. Some individual requests mainly from interpolation point of view could be expected to fill the possible gaps mainly close the borderlines of concerned countries. Most countries have a certain additional climatological stations set to solve interpolation difficulties. Some gaps of

air pressure measurements (e.g. Slovakia), global radiation and sunshine duration data (e.g. Ukraine) can be expected. More issues are connected with the problems during the war in the former Republic of Yugoslavia (Serbia, Croatia and as a neighboring area Bosnia and Herzegovina), where data gaps are more frequent without possibility to complete the datasets. Other issues are connected with a transient period of change from manual to automatic weather stations. Some indirect methods for estimation some variables can be used, like sunshine duration for global radiation computation. The gaps of sunshine duration can be approximate with data of cloudiness, but not in all stations.

3.2 Precipitation stations

The precipitation stations coverage is more complex issue comparing climatological stations. One of the issues is the fact the climatological and precipitation networks belong to different institutes, or to the different division of services (e.g. Romania, Ukraine). This is closely connected to the summarised number of stations eventually the quality control of data series. The second issue is the length of climatological and precipitation data series in electronic database which does not cover the full period 1960-2010 (e.g. Slovakia) and the data have to be digitized.

4. Specification of existing data gaps

Each country has produced a review, giving overall summary information on data availability, expressed in percentage of all data in electronic databases (mainly in every decade of 1961 - 2010 period). The country reviews covering individual stations are in Annex 1. Basic documents for creating more precise review are special EXCEL files “StationProperties.xls” and “VariablesProperties.xls”, giving very detailed metadata information (see Annex 2). They will be the crucial source of metadata database, which will be available for Module 2 activities.

5. Proposed methodologies to fill in existing data gaps

Editing data from existing archive documents such a Climatological and precipitation records is the basic way for filling data gaps in electronic database. The digitization of same specific analogue sources, e.g. ombrograms, sunshine paper sheets, anemograms is more time consuming approach. The common denominators of filling the gaps are metadata of edited (digitized) variables, included into metadata profile and quality control of data in the frame of D1.11 deliverable. Completion of the series can be performed by Mash homogenization procedure (D.1.8), which has a gap filling part. It means, that all homogenized (monthly) time series will be full without gaps.

6. Existing analogue datasets to be digitized

According to D1.9 deliverable there were clearly indentified variables to be edited or digitized. The sources of data are numerical/analogue records and electronic data in not

accessible form. The original data can be acquired directly from the measurements, or taken from analogue records or tapes (thermogram, ombrogram etc). Other sources like year books, or data from other institutions can be used. More levels of quality control should be applied to all digitized data. More techniques for digitizing or editing are available. Procedures ICR/OCR (character recognising) is most comfortable and less time consuming. Manual typing or usage of graphic digitizers (converting analogue data to numeric codes)is the simplest way for data rescue.

7. Next steps

Preparation of country set of stations and gathering metadata mainly for homogenisation procedures and interpolation will require the detailed analyses of overall CARPATCLIM station sets with respect to individual variables firstly. The eventually possible gaps in regular distribution of stations could be eliminated and some countries (Ukraine and Romania) should add required number of precipitation stations if possible. The first step is to fill in carefully all available metadata into database, enabling to produce lists, maps and other background sources for decisions on the completeness, regularity in covering Carpathian region in all relevant variables.

9. References

D1.7 Proposal for quality control tests to be performed for all observational time series, Submitted to JRC.

D1.8 Proposal for homogenization methods to be applied to all observational time series, Submitted to JRC.

D1.9 Report on preliminary results of the data rescue and digitization exercise, per country

EN ISO 19115:2003: Geographic information – Metadata

INSPIRE Metadata Implementing Rules: Technical Guidelines based on EN ISO 19115 and EN ISO 19119, v. 1.1

WMO Core Metadata Profile version 1.2, Guidelines on the use of Metadata for WIS, Geneve, 2010

10. Annexes

Annex 1 - Country reports of data inventory of meteorological stations per month to be considered for the service, including the specification of existing data gaps and proposed methodologies to fill them, and of existing analogue datasets to be digitized.

Annex 2 - Example of metadata Excel file and information regarding data gaps and existing data sources.

Tab.1. Minimum, optimum and proposed number of climatological and precipitation stations used in CARPATCLIM project in period 1961 - 2010

1	2	3	4	5	6	7	8	9	10	11	12
Country	Area (sqkm)	Area (%)	Min CLIM	Min PREC	Min CLIM +PREC	Opt CLIM (+ 10%)	Opt PREC (+ 10%)	Opt CLIM +PREC (+ 10%)	Prop CLIM	Prop PREC	Prop CLIM +PREC
Austria	0	0	0	0	0	0	0	0	0	0	0
Croatia	14663	3.0	6	18	24	7	20	27	7	19	26
Czech Republic	12571	2.6	5	15	20	6	17	23	6	17	23
Hungary	86996	18.0	35	104	139	39	114	153	37	139	165
Poland	19794	4.1	8	24	32	9	26	35	9	26	35
Romania	184435	38.1	74	221	295	81	243	324	91	67	158
Serbia	45015	9.3	18	54	72	20	60	80	21	42	63
Slovakia	48520	10.0	20	57	77	22	63	85	22	63	85
Ukraine	71531	14.8	29	85	114	32	94	126	30	*prep	*30
Sum	483525	0.0	195	578	773	216	543	853	223	*373	*585

*prep – in preparation, *373, *585 - not completed

Column	Content
4	Min CLIM : Minimum number of climatological stations
5	Min PREC: Minimum number of precipitation stations
6	Min CLIM+PREC: Minimum total of all stations
7	Opt CLIM: Optimum number of climatological stations (Min + 10%)
8	Opt PREC: Optimum number of precipitation stations further to CLIM stations (Min + 10%)
9	Opt CLIM+PREC: Optimum total of all stations (Min + 10%)
10	Prop CLIM: Proposed number of climatological stations made by individual country
11	Prop PREC: Proposed number of precipitation stations further to CLIM stations made by individual country
12	Prop CLIM+PREC: Proposed total of all stations made by individual country

10. Annexes

Annex 1 - Country reports of data inventory of meteorological stations per month to be considered for the service, including the specification of existing data gaps and proposed methodologies to fill them, and of existing analogue datasets to be digitized

Countries reports reports:

Croatia,
prepared by: Janja Milković, Melita Perčec Tadić, Dubravka Rasol

Czech Republic,
prepared by: Pavel Zahradníček

Hungary,
prepared by: Monika Lakatos and Zita Bihari

Poland,
prepared by: Elżbieta Cebulak, Danuta Limanówka, Robert Pyrc, Piotr Kilar

Romania:
prepared by: Monica Matei, Sorin Cheval, Codrina Ilie

Serbia
prepared by: Dragan Mihić

Slovakia:
prepared by: Pavol Nejedlík, Pavel Šťastný, Katarína Mikulová

Ukraine:
prepared by: Oleg Skrynyk and Yurii Nabyvanets

1. Croatia

D1.6 Report of data inventory of meteorological stations per month to be considered for the service, including the specification of existing data gaps and proposed methodologies to fill them, and of existing analogue datasets to be digitized.

prepared by Mr. Sc. Janja Milković, Melita Perčec Tadić, Dubravka Rasol

Tab.1. Data completeness for Climatological stations list in Croatia

0	0	1	2	3	4	5	6	7	8	9	10
No	Nat Ind	Stat Name	LAT	LONG	ALT	61-70	71-80	81-90	91-00	01-10	61-10
1	14253	Bjelovar	45,917	16,850	141	100	100	100	100	100	100
2	14258	Daruvar	45,600	17,233	161	0	30	100	100	100	66
3	5490	Donji Miholjac	45,767	18,167	97	100	100	100	100	100	100
4	4230	Đurđevac	46,050	17,067	121	100	100	100	100	100	110
5	14280	Osijek	45,550	18,666	91	100	100	100	100	100	100
6	14370	Slavonski Brod	45,166	18,000	88	100	100	100	100	100	100
7	5110	Valpovo	45,667	18,350	92	75	100	100	100	100	95

Columns 5 -10: Completeness (in %) in database in decades 1961 - 1970 (61-70) etc and whole period 1961 - 2010 (61-10)

Tab.2. Data completeness for Precipitation stations list in Croatia

0	0	1	2	3	4	5	6	7	8	9	10
No	Nat Ind	Stat Name	LAT	LONG	ALT	61-70	71-80	81-90	91-00	01-10	61-10
1	5200	Aljmaš Planina	45,533	18,983	150	100	100	100	100	100	100
2	4520	Antunovac	45,500	17,000	133	100	100	100	100	100	100
3	5270	Cerna	45,183	18,700	94	100	100	100	100	100	100
4	4890	Čačinci	45,600	17,867	120	100	100	100	100	100	100
5	4080	Ferdinandovac	46,067	17,200	113	100	100	100	100	100	100
6	4020	Gola	46,200	17,050	121	100	100	100	100	100	100
7	4920	Marijanci	45,667	18,300	97	100	100	100	100	100	100
8	5330	Nijemci	45,133	19,030	90	100	100	100	30	100	86
9	4485	Okučani	45,267	17,200	119	100	100	100	50	100	90
10	4500	Pakrac	45,450	17,200	220	100	100	100	50	100	90
11	4820	Pleternica	45,283	17,800	153	100	100	100	100	100	100
12	4110	Sedlarica	45,900	17,200	187	100	100	100	100	100	100
13	5060	Semeljci	45,350	18,550	103	100	100	100	100	100	100
14	4810	Sibinj	45,183	17,917	118	100	100	100	100	100	100
15	5310	Slavonski Šamac	45,066	18,500	89	100	100	100	100	100	100
16	4150	Šandrovac	45,900	17,033	144	100	100	100	100	100	100
17	5020	Trnava Đakovo	45,266	18,266	150	100	100	100	100	100	100
18	4570	Trnava Garešnica	45,666	17,033	145	100	100	100	100	100	100
19	5070	Vuka	45,433	18,500	93	100	100	100	100	100	100

Columns 5 -10: Completeness (in %) in database in decades 1961 - 1970 (61-70) etc and whole period 1961 - 2010 (61-10)

2. Czech Republic

CZECH HYDROMETEOROLOGICAL INSTITUTE

Module 1 – D 1.6.

Czech Republic

- Study area in the Czech Republic: 12.571 km^2 = 2.6%
- Minimum number of stations for the CARPATCLIM project
  - Climatological ones: 5
  - Precipitation ones: 15
  - Total: 20
- Optimal number of stations (minimum + 10%) for the CARPATCLIM project
  - Climatological ones: 6
  - Precipitation ones: 17
  - Total: 23

For the given area there are available 48 climatological and 161 precipitation stations (meaning all the locations even with very short period of measurements). From this dataset were selected the stations that cover the study period (1961-2010), have no or very low number of missing values also have equal spatial distribution. Four of the climatological stations measure all the required meteorological elements. Stations „Strání“ and Frenštát pod Radhoštěm“ do not cover sunshine duration and air pressure. Four of the climatological stations have no missing data and the other two contain 99.9% of all data (15-20 days are missing). Out of 17 precipitation stations, 7 have no missing data. Other precipitation stations contain from 30 to 581 missing values, but a maximum length of the period without data is 15 days.

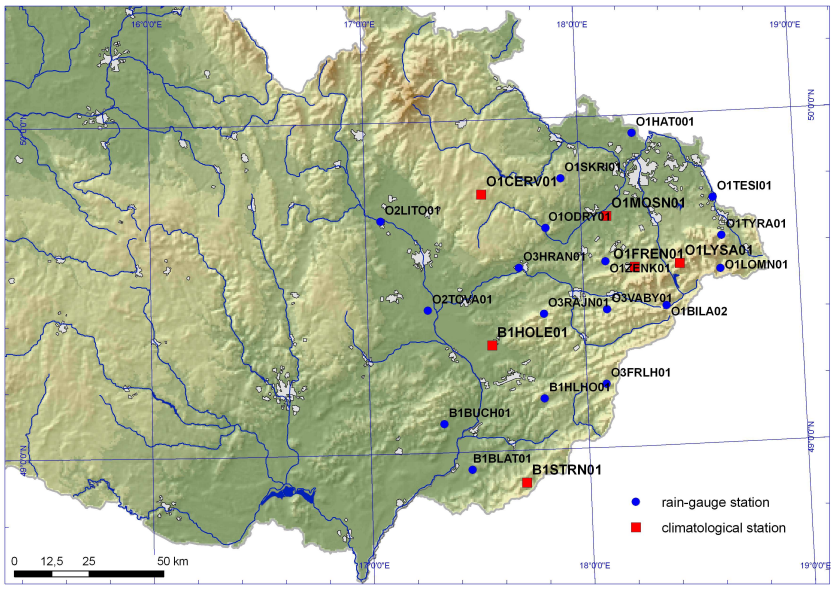

Figure 1. Climatological and precipitation stations used for CARPATCLIM project

Table 1. Climatological stations

0	1	2	3	4	5	6	7	8	9	10
No	STAT NAME	LAT	LONG	ALT	61-70	71-80	81-90	91-00	01-10	61-10
1	Holešov	49,3206	17,5697	222	100	100	100	100	100	100
2	Strání	48,9028	17,7078	383	100	100	99,6	100	100	99,9
3	Červená	49,7772	17,5419	749	100	100	100	100	100	100
4	Frenštát pod Radhoštěm	49,5411	18,2406	436	100	99,5	100	100	100	99,9
5	Lysá hora	49,5461	18,4478	1322	100	100	100	100	100	100
6	Mošnov	49,6983	18,1217	250	100	100	100	100	100	100

Table 2. Precipiation stations

0	1	2	3	4	5	6	7	8	9	10
No	STAT NAME	LAT	LONG	ALT	61-70	71-80	81-90	91-00	01-10	61-10
1	Blatnice	48,9467	17,4611	211	100	99,8	100	100	94,2	98,8
2	Buchlovice	49,0875	17,3392	255	100	100	98,3	98,3	98,3	99
3	Horní Lhota	49,1550	17,8033	348	99,2	100	99,2	100	100	99,7
4	Bílá	49,4222	18,3806	770	100	100	100	100	100	100
5	Hať	49,9458	18,2542	220	100	100	100	100	100	100
6	Horní Lomná	49,5264	18,6375	594	100	100	100	100	100	100
7	Odry	49,6694	17,8353	290	100	100	100	100	100	100
8	Skřipov	49,8178	17,9139	485	100	100	100	100	100	100
9	Český Těšín	49,7425	18,6167	282	100	100	100	100	100	100
10	Tyra	49,6258	18,6494	500	99,2	93,3	98,3	94,1	99,2	96,8
11	Ženklava	49,5617	18,1069	340	100	99,2	100	100	100	99,8
12	Litovel	49,7044	17,0711	234	100	100	100	99,2	100	99,8
13	Tovačov	49,4319	17,2792	199	100	100	100	100	100	100
14	Francova Lhota	49,1925	18,0894	480	88,1	98,3	100	100	100	97,3
15	Hranice	49,5519	17,7058	241	100	95,8	100	95,8	99,2	98,1
16	Rajnochovice	49,4111	17,8139	405	94,2	99,2	99,2	100	100	98,5
17	Valašská Bystřice	49,4164	18,1063	458	100	99,2	100	100	100	99,8

3. Hungary

PRELIMINARY REPORT
Module 1, Deliverable D 1.6
Report of data inventory
prepared by Monika Lakatos and Zita Bihari
Hungarian Meteorological Service

According to the data archives of the Hungarian Meteorological Service the detailed of the climatological and precipitation stations information are summarized in this section, e.g. position of stations and the data availability. The digitization of the additional stations is in progress. Overall 37 climatological and 139 precipitation stations will be the part of the tender service. Completion of the series will perform by Mash homogenization procedure (D.1.8)

Table 1. List of the Hungarian climatological stations as part of the data inventory with the decadal data exists

stna	stno	lat	lon	% of data exists in the period of 1961-1970	% of data exists in the period of 1971-1980	% of data exists in the period of 1981-1990	% of data exists in the period of 1991-2000	% of data exists in the period of 2000-2010
Aszód	44214	47.6556	19.4764	100	100	99.6	98.3	100
Baja Csávoly	48101	46.1833	19.0167	100	100	100	100	100
Békéscsaba	66519	46.6794	21.1606	100	100	100	100	100
Budapest belterület	44121	47.5111	19.0281	100	100	100	100	100
Budapest Pestszentlőrinc-külterület	44527	47.4292	19.1822	100	100	100	100	100
Debrecen	64704	47.4903	21.6108	100	100	100	100	100
Dunaújváros	36407	46.9506	18.9522	89.2	80	100	100	100
Győr Likócs	23703	47.71	17.6747	96.7	100	100	100	100
Homokszentgyörgy	28700	46.1033	17.5269	90	80	98.3	92.7	100
Iklódbördőce	17306	46.6056	16.6131	87.5	80	97.1	98.3	100
Iregszemcse	36500	46.6856	18.1836	90	99.2	98.3	99.2	100
Jósvafő	51705	48.4953	20.5361		100	100	96.7	100
Kalocsa Öregcsertő	47106	46.5103	19.0989	87.5	90	97.5	96.7	100
Kapuvár	24100	47.5617	17.0392		80	100	56	100
Kecskemét külterület	46303	46.9131	19.7483	90	100	100	100	100
Kékestető	53101	47.8667	20.0167	82.5	100	100	100	100
Keszthely Tanyakereszt	26505	46.7356	17.2386	100	100	100	100	100
Kompolt	53521	47.7397	20.2358		90	100	93.3	100
Körösszakál	65700	47.0197	21.5942		55.8	99.2	100	96.5
Miskolc Avas	52819	48.0969	20.7714	100	100	100	100	100
Mosonmagyaróvár	23201	47.8897	17.2672	100	100	100	100	100

Nagykanizsa	17809	46.4561	16.9706	100	100	100	100	100
Nyíregyháza Napkor	63411	47.9622	21.8869	100	100	100	100	100
Orosháza	57311	46.5442	20.6875		80	83.4	55.8	100
Paks	37402	46.5736	18.8456		80	100	100	100
Pápa Nyárád	25212	47.2922	17.3722		80	100	89.2	98.8
Pátyod	73302	47.8622	22.6256	90	90	100	97.3	100
Pécs Árpádtető	38605	46.1347	18.2522		94.2	100	80.8	100
Pécs Pogány	39113	45.995	18.235	100	100	100	100	100
Penc	43613	47.79	19.2836	90	80	99.2	99.2	100
Pitvaros	58300	46.3172	20.7367		90	100	100	100
Poroszló	54306	47.6447	20.6478		80	100	100	100
Sátoraljaújhely	61709	48.3808	21.6589		90	98.3	93.3	100
Siófok	36100	46.9108	18.0408	100	100	100	100	100
Sopron Kuruc-domb	13704	47.6783	16.6022	100	100	100	100	100
Sopronhorpács	14706	47.4814	16.7292	90	80	100	100	100
Szarvas	56300	46.8694	20.5278		100	100	99.3	100
Szeged külterület	58113	46.2561	20.0903	100	100	100	100	100
Szentgotthárd Farkasfa	16204	46.9103	16.3094	100	100	100	100	100
Szolnok Szandaszőlős	55502	47.1286	20.II	60.8	100	100	100	100
Szombathely	15310	47.1983	16.6478	100	100	100	100	100
Tata	34211	47.6517	18.3108	90	100	90	97.5	100
Tiszaroff	54604	47.3981	20.4456		80	100	100	100
Túrkeve	55706	47.1064	20.74	89.2	100	100	100	100
Zalaegerszeg Nagykutas	16414	46.9258	16.8128	95.8	100	100	100	100

Table 2. List of the Hungarian precipitation stations as part of the data inventory with the percentage of data exists

No	COUNTRY	NAT ID	STAT NAME	LAT	LONG	ALT	% of data exists in the period of 1961-2010
1	HU	38511	Abaliget	46.1425	18.1167	220	100
2	HU	45405	Abony	47.1833	20.0000	96	100
3	HU	39600	Alsószentmárton	45.7833	18.3167	93	100
4	HU	48502	Bácsbokod	46.1167	19.1500	119	100
5	HU	48101	Baja Csávoly	46.1833	19.0167	113	100
6	HU	38525	Bakonya	46.0833	18.0833	237	100
7	HU	25304	Bakonybél	47.2525	17.7300	268	99.2
8	HU	24803	Bakonyszentkirály	47.3642	17.8786	281	100
9	HU	26601	Balatonkeresztúr	46.6981	17.3719	121	100
10	HU	26602	Balatonújlak	46.6833	17.3833	111	100
11	HU	26826	Bálványos	46.7833	17.9500	201	100

12	HU	29201	Barcs	45.9500	17.4500	108	100
13	HU	68101	Battonya	46.2833	21.0167	105	100
14	HU	43210	Becske	47.9000	19.3833	231	100
15	HU	24506	Beled	47.4667	17.1167	134	100
16	HU	65107	Biharnagybajom	47.2000	21.2333	94	100
17	HU	36708	Bikács	46.6833	18.6667	109	100
18	HU	53300	Bogács	47.9000	20.5333	187	100
19	HU	44121	Budapest belterület	47.5111	19.0281	230	100
20	HU	52510	Bükkszenterzsébet	48.0667	20.1667	196	100
21	HU	52742	Bükkzsérc	48.0000	20.5167	361	100
22	HU	56114	Cibakháza	46.9667	20.2000	93	100
23	HU	58306	Csanádpalota	46.2500	20.7167	96	100
24	HU	56407	Csárdaszállás	46.8667	20.9333	86	100
25	HU	72203	Csaroda	48.1667	22.4667	113	100
26	HU	28308	Csököly	46.3000	17.5500	159	100
27	HU	28103	Csurgó	46.2667	17.1000	148	100
28	HU	64704	Debrecen	47.4903	21.6108	107.6	100
29	HU	52205	Dédestapolcsány	48.1833	20.4667	215	99.2
30	HU	42504	Drégelypalánk	48.0500	19.0500	155	100
31	HU	43806	Ecséd	47.7333	19.7833	158	100
32	HU	53215	Eger	47.9039	20.3889	225.2	100
33	HU	52506	Erdőkövesd	48.0500	20.1000	205	100
34	HU	53602	Erdőtelek	47.6858	20.3150	113	100
35	HU	48105	Felsőszentiván	46.2000	19.1833	133	100
36	HU	35504	Füle	47.0500	18.2500	174	100
37	HU	53604	Füzesabony	47.7500	20.4167	114	100
38	HU	56704	Gádoros	46.6667	20.5833	91	100
39	HU	43226	Galgaguta	47.8500	19.3500	181	100
40	HU	43603	Galgagyörk	47.7500	19.3833	176	100
41	HU	37522	Gölle	46.4286	18.0172	148	100
42	HU	34302	Gyermely	47.6000	18.6333	191	94.1
43	HU	43808	Gyöngyöspata	47.8167	19.7833	203	100
44	HU	64610	Hajdúszoboszló	47.4500	21.3833	97	100
45	HU	25711	Herend	47.1331	17.7467	342	100
46	HU	27500	Iharos	46.3500	17.1000	196	100
47	HU	36500	Iregszemcse	46.6856	18.1836	165	100
48	HU	46600	Izsák	46.8000	19.3667	107	99.2
49	HU	54508	Jászladány	47.3667	20.1667	91	100
50	HU	53307	Kács	47.9667	20.6167	201	100
51	HU	47106	Kalocsa Öregcsertő	46.5103	19.0989	93.6	98.4
52	HU	35314	Kápolnásnyék	47.2433	18.6850	115	100
53	HU	42707	Karancsalja	48.1333	19.7500	243	100
54	HU	42304	Karancskeszi	48.1667	19.7000	199	100
55	HU	62400	Karcsa	48.3167	21.8000	107	100
56	HU	46303	Kecskemét külterület	46.9131	19.7483	114	100
57	HU	26100	Kehidakustány	46.8500	17.1000	126	100
58	HU	62800	Kemecse	48.0667	21.8000	105	100
59	HU	25108	Kemenesszentmárton	47.2931	17.1642	133	100

60	HU	62303	Kenézlő	48.2000	21.5500	105	100
61	HU	25200	Kerta	47.1667	17.2667	141	100
62	HU	26505	Keszthely Tanyakereszt	46.7356	17.2386	111.7	100
63	HU	65604	Komádi	47.0167	21.5000	93	100
64	HU	33508	Komárom Szőny	47.7333	18.1667	113	100
65	HU	56805	Kondoros	46.7667	20.7750	89	100
66	HU	65704	Körösszakál	47.0333	21.6000	99	100
67	HU	54702	Kunhegyes	47.3667	20.6333	93	100
68	HU	25208	Kup	47.2500	17.4500	213	100
69	HU	37604	Kurd	46.4500	18.3167	124	100
70	HU	58600	Kübekháza	46.1500	20.2833	83	100
71	HU	36612	Lajoskomárom	46.8306	18.2928	123	100
72	HU	26704	Lengyeltóti	46.6667	17.6500	149	100
73	HU	35505	Lepsény	47.0000	18.2500	120	100
74	HU	64810	Létavértes	47.3833	21.8833	118	100
75	HU	72119	Mándok	48.3167	22.1833	114	95.9
76	HU	27225	Marcali	46.5833	17.4167	130	98.3
77	HU	33412	Márianosztra	47.8667	18.8667	232	100
78	HU	43406	Mátraverebély	47.9833	19.7833	186	97.5
79	HU	66611	Méhkerék	46.7742	21.4533	94	100
80	HU	27416	Mernye	46.5000	17.8167	169	100
81	HU	27209	Mesztegnyő	46.5000	17.4333	141	100
82	HU	53703	Mezőkövesd	47.8011	20.5500	117	100
83	HU	57108	Mindszent	46.5167	20.1833	87	100
84	HU	52819	Miskolc Avas	48.0969	20.7714	232.8	100
85	HU	43207	Mohora	47.9833	19.3500	193	100
86	HU	23201	Mosonmagyaróvár	47.8897	17.2672	121	100
87	HU	27607	Nagybajom	46.4000	17.5000	165	100
88	HU	26326	Nagyvázsony	46.9886	17.7025	269	100
89	HU	43128	Nógrád	47.9000	19.0500	237	100
90	HU	42303	Nógrádszakál	48.1833	19.5333	204	100
91	HU	63411	Nyíregyháza Napkor	47.9622	21.8869	142.1	100
92	HU	72509	Nyírmada	48.0650	22.1933	131	95.8
93	HU	25502	Ötvös	47.0333	17.1667	156	100
94	HU	37402	Paks	46.5736	18.8456	97.2	100
95	HU	43427	Parádsasvár	47.9167	19.9833	357	100
96	HU	43304	Pásztó	47.9144	19.6933	181	100
97	HU	39113	Pécs Pogány	45.9950	18.2350	200.2	100
98	HU	24421	Pér	47.6167	17.8000	133	100
99	HU	36613	Pincehely	46.6833	18.4333	115	100
100	HU	54306	Poroszló	47.6447	20.6478	90.2	100
101	HU	22502	Rajka	48.0000	17.2000	131	100
102	HU	53120	Recsk	47.9333	20.1167	173	100
103	HU	48403	Ruzsa	46.3167	19.7667	111	100
104	HU	42800	Salgótarján Rónafalu	48.1333	19.8667	451	100
105	HU	36100	Siófok	46.9108	18.0408	108.2	100
106	HU	26800	Somogytúr	46.7000	17.7833	152	100

107	HU	34501	Súr	47.3667	18.0333	243	100
108	HU	26202	Sümeg	46.9833	17.2833	178	96.7
109	HU	37202	Szakály	46.5333	18.3833	117	100
110	HU	37100	Szakcs	46.5500	18.1167	193	100
111	HU	38307	Szálka	46.2833	18.6333	169	100
112	HU	58100	Szeged Kiskundorozsma	46.3000	20.0167	90	100
113	HU	52401	Szikszó	48.2000	20.9333	125	100
114	HU	51303	Szin	48.5000	20.6667	156	100
115	HU	36506	Tab	46.7333	18.0167	178	100
116	HU	62501	Taktaharkány	48.0833	21.1333	99	100
117	HU	44812	Tápiószele	47.3419	19.8794	106	100
118	HU	26207	Tapolca	46.8833	17.4500	126	100
119	HU	34210	Tatabánya Felsőgalla	47.5333	18.4500	203	100
120	HU	63700	Téglás	47.7128	21.6783	145	100
121	HU	37302	Tengelic	46.5303	18.7108	121	100
122	HU	62505	Tiszadob	48.0167	21.1667	108	100
123	HU	53801	Tiszadorogma	47.6833	20.8667	95	100
124	HU	62613	Tiszalök	48.0167	21.3833	101	100
125	HU	54604	Tiszaroff	47.3981	20.4456	86.8	100
126	HU	43116	Tolmács	47.9333	19.1167	197	100
127	HU	55706	Túrkeve	47.1064	20.7400	85.9	100
128	HU	26104	Türje	46.9833	17.1000	153	100
129	HU	25714	Úrkút	47.0833	17.6333	401	100
130	HU	44204	Valkó	47.5667	19.4833	170	100
131	HU	52714	Varbó	48.1500	20.6167	211	100
132	HU	25716	Városlőd	47.1500	17.6500	295	100
133	HU	53513	Vécs	47.8167	20.1667	140	100
134	HU	44615	Vecsés	47.4000	19.2833	121	100
135	HU	66209	Vésztő	46.9333	21.2667	91	100
136	HU	28501	Vízvár	46.0833	17.2333	126	100
137	HU	26501	Zalacsány	46.8000	17.1000	125	100
138	HU	26502	Zalavár	46.6708	17.1636	123	100
139	HU	65602	Zsáka	47.1333	21.4333	98	100

4. Poland

D1.6 Report of data inventory of meteorological stations per month to be considered for the service, including the specification of existing data gaps and proposed methodologies to fill them, and of existing analogue datasets to be digitized.

(Elżbieta Cebulak, Danuta Limanówka, Robert Pyrc, Piotr Kilar)

In CARPATCLIM project we are using stations from Polish measurement network. Stations are categorized in five groups:

- Synoptic station 1st rank
- Synoptic station 2nd rank
- Climatological station 3rd rank
- Climatological station 4th rank
- Precipitation station 5th rank

Differences between rank of the station regarding mainly number of measurements per day and number of measured elements.
We are using data from our historical database, there are some gaps (tab.1 and tab.2) which are filled by manual typing from original observer diaries.

Tab.1. Data completeness for Climatological stations list

0	1	2	3	4	5	6	7	8	9	10
No	STAT NAME	LAT	LONG	ALT	61-70	71-80	81-90	91-00	01-10	61-10
1	BIECZ-GRUDNIA	21°17'45"	49°44'07"	285	100	100	100	100	100	100
2	BIELSKO BIAŁA	19°00'04"	49°48'29"	398	50	100	100	100	100	90
3	JABŁONKA	19°41'45"	49°28'19"	615	100	100	100	100	100	100
4	KASPROWY WIERCH	19°58'55"	49°13'57"	1991	50	100	100	100	100	90
5	LESKO	22°20'30"	49°27'59"	420	50	100	100	100	100	90
6	MAKÓW PODHALAŃSKI	19°41'17"	49°43'33"	360	100	100	100	100	100	100
7	NOWY SĄCZ	20°41'21"	49°37'38"	292	50	100	100	100	100	90
8	WYSOWA	21°10'21"	49°26'17"	519	100	100	100	100	100	100
9	ZAKOPANE	19°57'37"	49°17'38"	855	50	100	100	100	100	90

Columns 5 -10: Completeness (in %) in database in decades 1961 - 1970 (61-70) etc and whole period 1961 - 2010 (61-10)

Stations 1-9

- Synoptic station (1st rank) – measurements and observations are made using manual and automatic methods each hour. Full range of measurements and visual observations are done all day.
- Synoptic station (2nd rank) - measurements and observations are made using manual and automatic methods each hour. Full range of measurements and visual observations are done 8-12 hours per day only at daytime, automatic measurements are done all day.
- Climatological station (3rd rank) – measurements and observations are made using manual and automatic methods three times per day, visual observations are done all day.

Times of observations In the period 1961-1970 was done 06:40, 12:40, 20:40 Local Time. Since 01.01.1971 measurements were done 06:00, 12:00, 18:00 UTC.

Wind measurements (1^{st} 2^{nd} 3^{rd} rank of station)
In the period 1961-2000 anemometer height ranged from 11 to 26 meters above the ground level, mainly on sheltered stations situated in narrow valleys or wooded areas. Since year 2000 height of anemometer was uniformed to 10 meters, except "Zakopane" where height of anemometer is 15 meters above the ground level.

Tab.2. Data completeness for Precipitation stations list

0	1	2	3	4	5	6	7	8	9	10
No	STAT NAME	LAT	LONG	ALT	61-70	71-80	81-90	91-00	01-10	61-10
1	CIESZYN	18°38'57"	49°45'18"	295	0	0	40	100	100	48
2	DOBCZYCE	20°04'15"	49°52'40"	306	0	0	40	100	100	48
3	GOCZAŁKOWICE-ZDRÓJ	18°58'53"	49°56'30"	250	100	100	100	100	100	100
4	GORLICE	21°10'16"	49°39'19"	300	0	0	100	100	100	60
5	HALA GĄSIENICOWA	20°00'21"	49°14'39"	1520	0	0	100	100	100	60
6	ISTEBNA-STECÓWKA	18°56'16"	49°35'06"	725	100	100	100	100	100	100
7	JABŁONKA	19°41'45"	49°28'19"	615	100	100	100	100	100	100
8	KAŃCZUGA	22°24'26"	49°59'07"	215	100	100	100	100	100	100
9	KOMAŃCZA	22°03'48"	49°20'21"	470	100	100	100	100	100	100
10	KORBIELÓW	19°20'54"	49°34'07"	650	100	100	100	100	100	100
11	KOSZARAWA	19°24'19"	49°39'21"	595	100	100	100	100	100	100
12	KROŚCIENKO	20°25'54"	49°26'44"	445	100	100	100	100	100	100
13	LIMANOWA	20°25'06"	49°41'37"	515	100	100	100	100	100	100
14	LUTOWISKA	22°41'35"	49°14'52"	615	100	100	100	100	100	100
15	MUSZYNA	20°53'11"	49°20'59"	445	100	100	100	100	100	100
16	PILZNO	21°18'30"	49°59'14"	195	100	100	100	100	100	100
17	PÓŁRZECZKI	20°12'55"	49°39'09"	660	100	100	100	100	100	100
18	ROZDZIELE	20°24'57	49°47'07	635	0	0	100	100	100	60

		"	"							
19	RYCERKA GÓRNA	19°00'32"	49°25'33"	710	100	100	100	100	100	100
20	SZAFLARY	20°01'35"	49°25'31"	640	100	100	100	100	100	100
21	SZCZYRK	18°59'41"	49°42'11"	600	100	100	100	100	100	100
22	TEMESZÓW	22°13'15"	49°41'31"	275	100	100	100	100	100	100
23	WADOWICE	19°30'46"	49°52'36"	260	100	100	100	100	100	100
24	WĘGLÓWKA	20°04'28"	49°45'01"	515	100	100	100	100	100	100
25	WISŁA-GŁĘBCE	18°52'39"	49°37'42"	480	100	100	100	100	100	100
26	ZAWOJA	19°31'08"	49°36'42"	697	100	100	100	100	100	100

Columns 5 -10: Completeness (in %) in database in decades 1961 - 1970 (61-70) etc and whole period 1961 - 2010 (61-10)

Stations 1-26

Precipitation posts (3rd rank and 5th rank) – Measurements of precipitations sum are made at 06:00UTC for the previous day using pluviometer with the 200 cm^2 inlet surface, value is read by the observer. Pluviometer is located 1 meter above the ground level, on posts located over 500 meters above the sea level height of pluviometer is 1,5 m.

5. Romania

Report of Data Inventory

Module 1, Deliverable 1.6

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The list of climatological and precipitation stations, that will be used in the CARPATCLIM project, together with their position and data availability are shown in the Table 1 and 2 respectively.

Regarding the stations density in the Carpathian region, for the Romanian territory, there are 91 climatological stations covering the entire area. Their spatial distribution is shown in figure 1.

Concerning the precipitation stations, in accordance with the Minute of the 2nd meeting of the CARPATCLIM project (Bratislava, 18-19 July, 2011) the optimal number of precipitation stations to be used is 243. We have been provided with information for 67 stations, regularly distributed, as shown in figure 2. Table 2 lists the precipitation stations and related information.

The percentages from table represent the completeness of digitalized data for all the parameters regarding the whole period of time. Missing data in the archive will be completed by means of homogenization procedure (MASH).

Table 1. List of climatological stations with coordinates and completeness of data in database for the period 1961-2010 from Romanian part of Carpathian region

0	1	2	3	4	10
No	**STATION NAME**	**LAT**	**LONG**	**ALT**	**61-10**
1	SIGHETUL MARMATIEI	47 56 21N	23 54 16E	275.00	100 %
2	RADAUTI	47 50 16N	25 53 26E	389.00	100 %
3	SATU MARE	47 43 17N	22 53 14E	123.00	100 %
4	BAIA MARE	47 39 39N	23 29 30E	216.00	100 %
5	OCNA SUGATAG	47 46 37N	23 56 26E	503.00	100 %
6	BOTOSANI	47 44 08N	26 38 44E	161.00	100 %
7	SUCEAVA	47 37 58N	26 14 26E	352.00	100 %
8	IEZER	47 36 09N	24 38 56E	1785.00	100 %
9	SACUIENI	47 20 39N	22 05 40E	124.00	100 %
10	COTNARI	47 21 30N	26 55 32E	289.00	100 %
11	ZALAU	47 11 42N	23 02 48E	295.00	100 %
12	POIANA STAMPEI	47 19 29N	25 08 04E	923.00	100 %
13	TARGU NEAMT	47 12 44N	26 22 45E	387.00	100 %
14	ORADEA	47 02 09N	21 53 45E	136.00	100 %
15	DEJ	47 07 41N	23 53 56E	232.00	100 %
16	BISTRITA	47 08 57N	24 30 50E	366.00	100 %
17	TOPLITA	46 55 35N	25 21 36E	687.00	100 %
18	PIATRA NEAMT	46 56 01N	26 23 22E	360.00	100 %
19	ROMAN	46 58 09N	26 54 43E	216.00	100 %
20	VLADEASA 1800	46 45 33N	22 47 39E	1836.00	100 %
21	CLUJ-NAPOCA	46 46 40N	23 34 17E	410.00	100 %
22	TARGU-MURES	46 32 00N	24 32 02E	308.00	100 %
23	BACAU	46 31 55N	26 54 45E	184.00	100 %
24	STEI	46 31 41N	22 27 59E	278.00	100 %
25	BAISOARA	46 32 08N	23 18 37E	1360.00	100 %
26	ODORHEIUL SECUIESC	46 17 48N	25 17 30E	523.00	100 %
27	MIERCUREA CIUC	46 22 17N	25 46 21E	661.00	100 %
28	DUMBRAVENI	46 13 40N	24 35 30E	318.00	100 %
29	TARGU OCNA	46 16 22N	26 38 28E	242.00	100 %
30	SANNICOLAUL MARE	46 04 17N	20 36 06E	85.00	100 %
31	ARAD	46 08 01N	21 21 13E	116.59	100 %
32	VARADIA DE MURES	46 01 09N	22 09 03E	156.00	100 %
33	BLAJ	46 10 42N	23 56 07E	337.00	100 %
34	BARAOLT	46 04 51N	25 35 45E	508.00	100 %
35	TARGU SECUIESC	45 59 34N	26 06 54E	568.00	100 %
36	DEVA	45 51 54N	22 53 56E	240.00	100 %

37	SEBES-ALBA	45 57 51N	23 32 29E	253.00	100 %
38	FAGARAS	45 50 11N	24 56 07E	428.00	100 %
39	TIMISOARA	45 46 16N	21 15 29E	86.00	100 %
40	PALTINIS SIBIU	45 39 26N	23 55 57E	1453.00	100 %
41	SIBIU	45 47 22N	24 05 29E	443.00	100 %
42	INTORSURA BUZAULUI	45 40 06N	26 03 24E	707.00	100 %
43	LACAUTI	45 49 26N	26 22 32E	1776.00	100 %
44	LUGOJ	45 41 12N	21 56 00E	123.00	100 %
45	BOITA	45 39 11N	24 16 18E	518.00	100 %
46	VARFU OMU	45 26 45N	25 27 24E	2504.00	100 %
47	BANLOC	45 22 58N	21 08 11E	83.40	100 %
48	CARANSEBES	45 25 02N	22 13 35E	241.00	100 %
49	PETROSANI	45 24 23N	23 22 36E	607.00	100 %
50	BRASOV-GHIMBAV	45 41 45N	25 31 34E	534.00	100 %
51	FUNDATA	45 25 53N	25 16 18E	1384.00	100 %
52	PREDEAL	45 30 23N	25 35 01E	1090.00	100 %
53	RAMNICU SARAT	45 23 26N	27 02 19E	152.00	100 %
54	SEMENIC	45 10 53N	22 03 21E	1432.00	100 %
55	CUNTU	45 18 02N	22 30 05E	1456.00	100 %
56	VOINEASA	45 24 40N	23 58 01E	573.00	100 %
57	PARANG	45 23 15N	23 27 47E	1548.00	100 %
58	CAMPULUNG MUSCEL	45 16 29N	25 02 12E	680.70	100 %
59	SINAIA 1500	45 21 18N	25 30 51E	1510.00	100 %
60	PATARLAGELE	45 19 29N	26 22 10E	289.00	100 %
61	ORAVITA	45 02 19N	21 42 38E	309.00	100 %
62	TARGU-JIU	45 02 26N	23 15 34E	203.00	100 %
63	APA NEAGRA	44 59 49N	22 51 34E	250.00	100 %
64	POLOVRAGI	45 09 56N	23 48 31E	531.00	100 %
65	MORARESTI	45 00 59N	24 34 13E	548.00	100 %
66	RAMNICU VALCEA	45 05 20N	24 21 46E	237.00	100 %
67	CURTEA DE ARGES	45 10 44N	24 40 11E	448.00	100 %
68	CAMPINA	45 08 37N	25 44 00E	461.00	100 %
69	BUZAU	45 07 58N	26 51 06E	97.00	100 %
70	TARGU LOGRESTI	44 52 41N	23 42 31E	262.00	100 %
71	PITESTI	44 50 56N	24 51 58E	316.00	100 %
72	TARGOVISTE	44 55 46N	25 25 32E	296.49	100 %
73	PLOIESTI	44 57 21N	25 59 15E	177.00	100 %
74	DRAGASANI	44 39 56N	24 14 14E	280.00	100 %
75	URZICENI	44 43 18N	26 39 26E	60.00	100 %
76	DROBETA-TURNU SEVERIN	44 37 35N	22 37 34E	77.00	100 %
77	BACLES	44 28 34N	23 06 47E	313.00	100 %
78	STOLNICI	44 33 46N	24 47 23E	208.72	100 %
79	BUCURESTI BANEASA	44 30 38N	26 04 41E	90.00	100 %
80	BUCURESTI FILARET	44 24 43N	26 05 38E	82.00	100 %
81	FUNDULEA	45 43 19	25 27 32E	-	100 %
82	CRAIOVA	44 18 37N	23 52 01E	192.00	100 %
83	VIDELE	44 16 58N	25 32 13E	106.18	100 %
84	BAILESTI	44 01 45N	23 19 52E	57.00	100 %
85	CARACAL	44 06 00N	24 21 26E	106.00	100 %
86	ROSIORII DE VEDE	44 06 26N	24 58 43E	102.15	100 %
87	CALAFAT	43 59 06N	22 56 46E	61.00	100 %

88	ALEXANDRIA	43 58 41N	25 21 10E	75.46	100 %
89	TURNU-MAGURELE	43 45 37N	24 52 42E	30.64	100 %
90	GIURGIU	43 52 31N	25 55 58E	23.60	100 %
91	BECHET	43 47 23N	23 56 39E	36.00	100 %

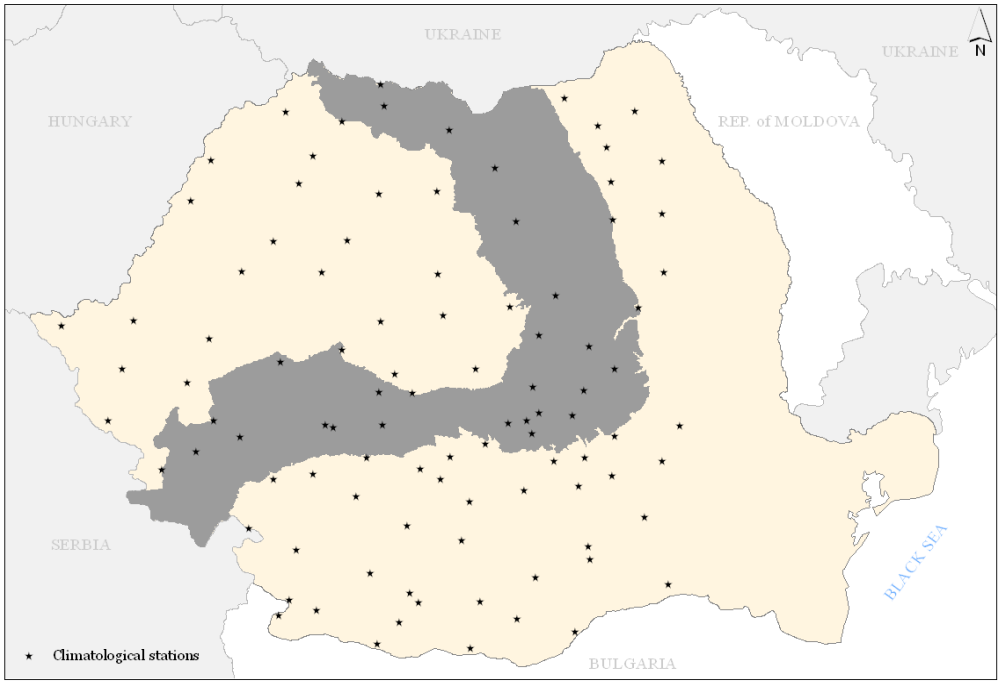

Figure 1. Distribution of climatological stations in the Romanian part of the Carpathian region

Table 2. List of precipitation stations with coordinates and completeness of data in database for the period 1961-2010 from the Romanian part of the Carpathian region

0	1	2	3	4	10
No	**STATION NAME**	**LAT**	**LONG**	**ALT**	**61-10**
1	MARASU	44 51 00	27 58 00	5	100%
2	IANCA	45 09 00	27 29 00	29	100%
3	SALCIA TUDOR	45 23 00	27 29 00	20	100%
4	CRUCEA	44 32 00	28 14 00	80	100%
5	LIPNITA	44 06 00	27 37 00	100	100%
6	NEGRU VODA	43 49 00	28 13 00	150	100%
7	ISACCEA	45 16 00	28 28 00	50	100%
8	PECENEAGA	45 00 00	28 09 00	66	100%
9	ZEBIL	44 57 00	28 46 00	10	100%
10	JEGALIA	44 18 00	27 38 00	20	100%
11	MANASTIREA	44 13 00	26 53 00	20	100%
12	GRINDU	44 46 00	26 54 00	66	100%
13	DEALUL FRUMOS	45 11 00	25 25 00	651	100%
14	VALEA LUNGA CRICOV	45 04 00	25 35 00	320	100%
15	GAIESTI	44 43 00	25 19 00	187	100%
16	PUCIOASA	44 57 00	25 26 00	180	100%
17	DOBRESTI	44 38 00	25 08 00	365	100%
18	TOPORU GIURGIU	44 01 00	25 39 00	85	100%
19	CEPTURA DE JOS	45 02 00	26 20 00	190	100%
20	VALENII DE MUNTE	45 10 00	26 03 00	300	100%
21	MUNTELE ROSU	45 29 00	25 56 00	1360	100%
22	ADÎNCATA	47 45 00	26 17 00	400	100%
23	FALTICENI	47 28 00	26 20 00	348	100%
24	FRASIN	47 32 00	25 47 00	650	100%
25	MOLDOVA SULITA	47 40 00	25 16 00	915	100%
26	VICOVU DE JOS	47 54 00	25 43 00	437	100%
27	BERESTI BISTRITA	46 43 00	26 52 00	240	100%
28	SOLONT	46 33 00	26 33 00	440	100%
29	BALTATESTI	47 07 00	26 19 00	420	100%
30	PANCIU	45 55 00	27 05 00	260	100%
31	SURAIA	45 41 00	27 23 00	34	100%
32	TAMBOIESTI	45 31 00	27 03 00	200	100%
33	AVRAMENI	48 01 00	26 58 00	240	100%
34	SANTA MARE	47 36 00	27 22 00	95	100%
35	GORBAN	46 52 00	28 05 00	40	100%
36	BOSTENI	47 13 00	26 43 00	248	100%
37	POIENI	47 03 00	27 43 00	265	100%
38	CAVADINESTI	46 04 00	28 01 00	45	100%
39	CUDALBI	45 46 00	27 41 00	90	100%
40	BALABANESTI	46 06 00	27 44 00	125	100%
41	VUTCANI	46 28 00	27 57 00	150	100%
42	COJOCNA	46 45 00	23 50 00	345	100%
43	CHIOCHIS	46 59 00	24 11 00	335	100%
44	SPERMEZEU	47 18 00	24 10 00	314	100%
45	CEHU SILVANIEI	47 24 00	23 11 00	210	100%
46	GARBOU	47 10 00	23 25 00	275	100%
47	LIVADA	47 52 00	23 07 00	130	100%
48	ARIESENI	46 28 00	22 46 00	900	100%

49	CATA	46 05 00	25 17 00	460	100%
50	BAILE TUSNAD	46 08 00	25 51 00	630	100%
51	IZVORUL MURESULUI	46 37 00	25 43 00	880	100%
52	GURGHIU	46 46 00	24 51 00	415	100%
53	SANGER	46 33 00	24 08 00	315	100%
54	IACOBENI	46 03 00	24 43 00	470	100%
55	POIANA SIBIULUI	45 48 00	23 44 00	870	100%
56	BUZIAS	45 39 00	21 36 00	126	100%
57	CERTEJUL DE SUS	45 58 00	22 58 00	270	100%
58	CETATE	44 06 00	23 03 00	40	100%
59	AMARASTI DE JOS	43 57 00	24 10 00	110	100%
60	MELINESTI	44 34 00	23 43 00	150	100%
61	GRUIA	44 16 00	22 43 00	93	100%
62	DRAGANESTI OLT	44 10 00	24 16 00	160	100%
63	ZATRENI	44 46 00	23 51 00	240	100%
64	CALIMANESTI	45 13 00	24 21 00	268	100%
65	BRATOVOIESTI (TITESTI)	45 26 00	24 23 00	470	100%
66	MATASARI	44 51 00	23 05 00	240	100%
67	BALTA	44 54 00	22 37 00	457	100%

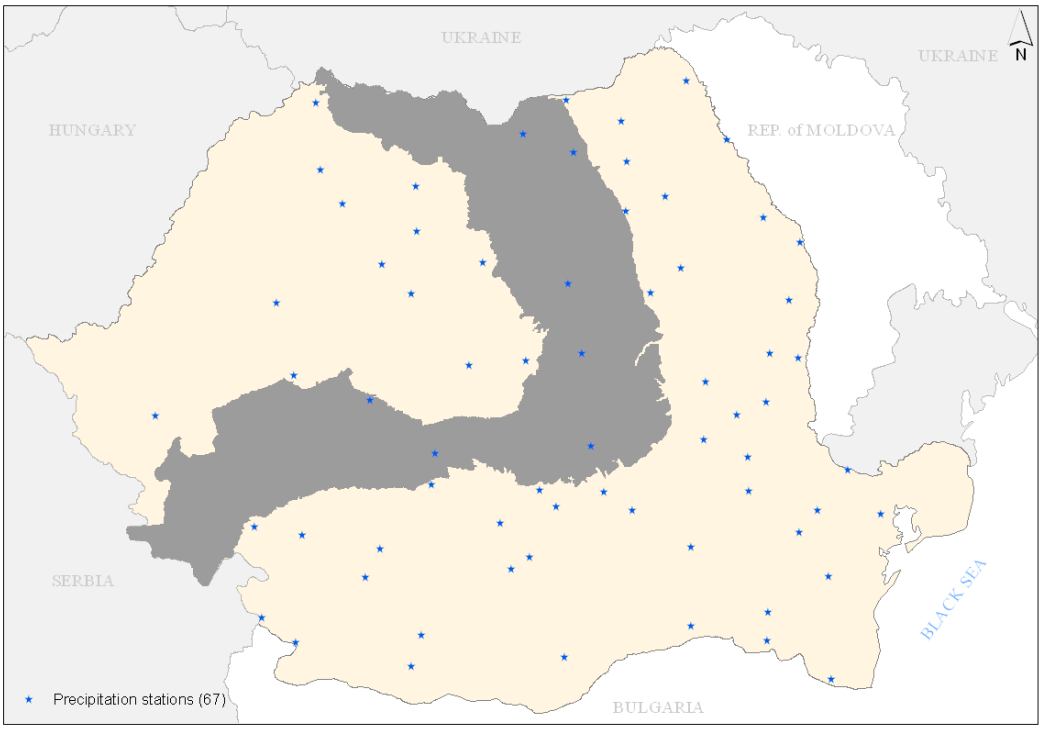

Figure 2. Distribution of precipitation stations in the Romanian part of the Carpathian region

6. Serbia:

Report of Data Inventory

prepared by Dragan Mihić

Republic Hydrometeorological Service of Serbia

Lists of stations that will be used for the CARPATCLIM project, together with their position and data availability in our database considering the whole period of interest (1961-2010), are shown in Tab. 1 (20 climatological stations) and Tab. 2 (42 precipitation stations). The percentages represent the completeness of digitalized data for all the parameters regarding the whole period of time. Data for some parameters that were not observed for certain period of time are calculated in the missing data percent. This means that although the data rescue and digitalization is in progress 100% limit could not be reached due to non existence of paper records for those parameters. That would have to be completed, where possible, by the use of homogenization procedure (MASH).

Table 1. List of climatological stations with coordinates and completeness of data in database for the period 1961-2010 from Serbian part of CARPATCLIM region

0	1	2	3	4	10
No	STAT NAME	LAT	LONG	ALT	61-10
1	Palić	46.0999	19.7613	102	97.7
2	Sombor	45.7666	19.1447	87	92.1
3	Novi Sad	45.3332	19.8447	86	97.1
4	Zrenjanin	45.3667	20.4113	80	83.2
5	Kikinda	45.8499	20.4613	81	93.4
6	Vršac	45.1500	21.3112	85	91.4
7	Loznica	44.5500	19.2281	121	99.9
8	Sremska Mitrovica	45.0094	19.5550	82	84.2
9	Valjevo	44.2834	19.9114	176	98.3
10	Beograd	44.8000	20.4613	132	100
11	Kragujevac	44.0334	20.9279	185	92.7
12	Smederevska Palanka	44.3668	20.9446	121	99.6
13	Veliko Gradište	44.7501	21.5112	82	98
14	Negotin	44.2334	22.5444	42	100
15	Bački Petrovac	45.3666	19.5614	85	86.7
16	Senta	45.9332	20.0779	80	89.4
17	Šabac	44.7667	19.6780	80	80.5
18	Ljubovija	44.1834	19.3781	170	89.8
19	Bela Crkva	44.9000	21.4112	90	77.4
20	Žagubica	44.2001	21.7778	314	83.5

Table 2. List of precipitation stations with coordinates and completeness of data in database for the period 1961-2010 from Serbian part of CARPATCLIM region

0	1	2	3	4	10
No	STAT NAME	LAT	LONG	ALT	61-10
1	Subotica	46.0999	19.7113	110	96.5
2	Horgoš	46.1666	19.9778	95	97.6
3	Mortonoš	46.1166	20.0612	85	93.1
4	Bački Monoštor	45.7999	18.9280	85	87.6
5	Bezdan	45.8499	18.9280	90	99.6
6	Gakovo	45.8999	19.0614	90	92.3
7	Bačka Topola	45.8166	19.6446	100	92
8	Gunaroš	45.7666	19.8279	100	94.8
9	Tornjoš	45.8832	19.8279	110	97.6
10	Bačko Gradište	45.5333	20.0279	85	96.6
11	Bečej	45.6333	20.0279	78	98.6
12	Bačko Petrovo Selo	45.7166	20.0778	80	96.6
13	Ada	45.7999	20.1278	80	93
14	Novi Bečej	45.5999	20.1446	80	99.1
15	Sajan	45.8499	20.2778	80	95.5
16	Melenci	45.5167	20.3112	80	95.3
17	Mokrin	45.8999	20.4112	85	97.6
18	Basaid	45.6333	20.4112	80	95.3
19	Torda	45.7199	20.4612	85	98.3
20	Toba	45.6833	20.5612	80	94.8
21	Rusko Selo	45.7499	20.5778	80	99.3
22	Srpska Crnja	45.7300	20.6945	80	98.6
23	Vajska	45.4332	19.1114	85	99.5
24	Bač	45.3999	19.2447	85	93.1
25	Bačka Palanka	45.2499	19.3780	80	92.8
26	Bački Petrovac	45.3667	19.5613	85	96
27	Temerin	45.4000	19.8779	80	97
28	Šajkaš	45.2833	20.0946	80	97.5
29	Mošorin	45.3000	20.1779	80	98.3
30	Aradac	45.3833	20.2946	80	95.3
31	Perlez	45.2167	20.3779	80	96.3
32	Ravni Topolovac	45.4667	20.5612	80	95
33	Tomaševac	45.2667	20.6278	80	89
34	Uzdin	45.2167	20.6112	80	97.1
35	Neuzina	45.3500	20.7112	80	94.5
36	Padina	45.1168	20.7278	110	95.5
37	Banatski Karlovac	45.0501	21.0278	89	99.3
38	Surčin	44.8167	20.2779	96	89.8
39	Radmilovac	44.7500	20.5779	130	85.4
40	Krupanj	44.3667	19.3781	280	85
41	Rudnik Planina	44.1334	20.5113	700	89.1
42	Čumić	44.1334	20.7613	366	91.7

7. Slovakia

PRELIMINARY REPORT
Module 1, Deliverable D 1.6
Report of data inventory
prepared by Pavol Nejedlík, Pavel Šťastný and Katarína Mikulová
Slovak Hydrometeorological Institute

Summary of data availability in the accordance with their completeness in data base and data archive of the Slovak Hydrometeorological Institute is the aim of this report. Regarding the station density criteria of the CARPATCLIM project 22 climatological and 63 precipitation stations were found covering quasi regularly the whole area of Slovak region taking into account the altitude variety of the territory. Summary of climatological stations, their position and availability of data in data base per decades of 1961 -2010 period is shown in Tab. 1. and precipitation stations in Tab. 2 respectively. All the stations will be the part of the tender service. The digitization and editing of the missing data in database from paper records is in progress. Missing data in archive (paper sheets and record) will be completed by means of homogenization procedure (MASH).

Table 1. List of climatological stations with coordinates and decadal completeness of data in database from region of Slovakia

0	1	2	3	4	5	6	7	8	9	10
No	STAT NAME	LAT	LONG	ALT	61-70	71-80	81-90	91-00	01-10	61-10
1	Myjava	48,7506	17,5781	409	100	100	100	92	100	98,4
2	Bratislava - Koliba	48,1686	17,1106	287	100	100	100	100	100	100,0
3	Jaslovské Bohunice	48,4919	17,6806	178	100	100	100	100	100	100,0
4	Hurbanovo	47,8731	18,1942	115	100	100	100	100	100	100,0
5	Čadca	49,4392	18,7753	423	0	100	100	99	100	79,8
6	Oravská Lesná	49,3683	19,1831	780	100	100	100	100	100	100,0
7	Liptovský Hrádok	49,0392	19,7253	640	0	100	100	100	100	80,0
8	Podbanské	49,1400	19,9106	972	99	100	100	99	99	99,4
9	Bzovík	48,3192	19,0939	355	0	98	100	100	100	79,6
10	Sliač	48,6425	19,1419	313	100	100	100	100	100	100,0
11	Lom nad Rimavicou	48,6444	19,6467	1015	96	97	100	100	100	98,6
12	Lučenec-Boľkovce	48,3389	19,7364	214	100	100	100	100	100	100,0
13	Skalnaté Pleso	49,1894	20,2358	1778	100	100	100	100	100	100,0
14	Prievidza	48,7697	18,5939	260	96	100	100	100	100	99,2
15	Telgárt	48,8486	20,1892	901	100	100	100	100	100	100,0
16	Štós-Kúpele	48,7167	20,8014	575	99	100	100	99	100	99,6
17	Plaveč nad Popradom	49,2597	20,8458	485	0	100	100	100	100	80,0
18	Košice - letisko	48,6722	21,2225	230	100	100	100	100	100	100,0
19	Medzilaborce	49,2533	21,9139	305	0	100	100	100	100	80,0
20	Milhostov	48,6681	21,7347	104	100	100	100	100	100	100,0
21	Kamenica n Cirochou	48,9389	22,0061	176	100	100	100	100	100	100,0
22	Trenčín	48,8969	18,0292	209	94	100	100	54	99	89,4

Columns 5 -10: Completeness in database in decades 1961 - 1970 (61-70) etc and whole period 1961 - 2010 (61-10)

Table 2. List of precipitation stations with coordinates and decadal completeness of data in database from region of Slovakia

0	1	2	3	4	5	6	7	8	9	10	11
P. č.	STAT NAME	LAT	LONG	ALT	61-70	71-80	81-90	91-00	01-10	61-10	Note
1	Reľov	49,298	20,385	723	P	P	100	100	100	60,0	S
2	Červený Kláštor	49,392	20,427	465	85	100	100	100	100	97,0	
3	Poprad	49,069	20,246	694	100	100	100	100	100	100,0	
4	Lomnicky Štít	49,195	20,215	2635	100	100	100	100	100	100,0	
5	Kežmarok	49,130	20,439	626	100	100	100	100	100	100,0	
6	Gbely	48,715	17,128	204	P	P	96	100	100	59,2	S
7	Senica	48,681	17,344	195	100	100	100	100	100	100,0	
8	Malacky	48,452	17,033	165	100	100	100	100	100	100,0	
9	Veľké Blahovo	47,988	17,613	115	P	P	100	100	100	60,0	S
10	Žihárec	48,066	17,869	111	100	100	100	100	100	100,0	
11	Kráľová pri Senci	48,196	17,454	124	100	100	100	100	100	100,0	
12	Štrbské Pleso	49,124	20,069	1354	100	100	100	100	100	100,0	
13	Chopok	48,944	19,592	2005	100	100	100	100	100	100,0	
14	Huty	49,216	19,558	795	N	N	100	100	100	60,0	P+S
15	Liptovská Teplá	49,100	19,411	512	N	N	100	100	98	59,6	P+S
16	Trstená	49,361	19,611	608	100	100	100	100	100	100,0	
17	Martin-Vrútky	49,110	18,913	415	P	P	100	100	100	60,0	S
18	Javorina	49,272	20,135	1030	99	100	100	100	100	99,8	
19	Makov	49,373	18,486	574	100	100	100	100	100	100,0	
20	Skalité	49,496	18,884	532	100	100	100	100	100	100,0	
21	Dolný Hričov	49,232	18,618	309	100	100	100	100	100	100,0	
22	Beluša	49,069	18,334	259	86	100	100	100	100	97,2	
23	Zubák	49,150	18,217	423	N	N	97	100	100	59,4	P+S
24	Piešťany	48,613	17,833	163	100	100	100	100	100	100,0	
25	Rybany	48,672	18,261	189	N	N	97	100	97	58,8	P+S
26	Zlatno	48,466	18,314	329	P	P	100	100	100	60,0	S
27	Podhájska	48,108	18,339	138	100	100	100	100	100	100,0	
28	Pohorelá	48,867	20,022	764	100	100	100	100	100	100,0	
29	Pohronská Polhora	48,752	19,808	637	100	100	100	100	100	100,0	
30	Mýto pod Ďumbierom	48,860	19,638	610	100	100	100	100	100	100,0	
31	Brusno	48,797	19,385	415	100	100	100	100	100	100,0	
32	Môlča	48,296	19,231	450	100	100	100	100	100	100,0	
33	Motyčky	48,862	19,168	650	98	100	100	100	100	99,6	
34	Detvianska Huta	48,565	19,592	825	100	98	100	100	100	99,6	
35	Vígľaš Pstruša	48,544	19,322	368	100	95	100	100	100	99,0	
36	Janova Lehota	48,656	18,786	410	95	100	100	100	100	99,0	

37	Sklené Teplice	48,534	18,864	333	100	95	100	100	100	99,0	
38	Jur nad Hronom	48,126	18,635	148	100	100	100	100	100	100,0	
39	Pukanec	48,354	18,732	348	100	94	100	100	100	98,8	
40	Žemberovce	48,261	18,811	220	100	100	100	100	100	100,0	
41	Farná	48,007	18,513	150	100	100	100	100	100	100,0	
42	Rúbaň	47,931	18,397	132	100	96	98	100	100	98,8	
43	Vysoká nad Uhom	48,619	22,117	105	95	100	100	100	100	99,0	
44	Michalovce	48,749	21,947	111	100	100	100	100	100	100,0	
45	Tisinec	49,216	21,650	216	100	100	100	100	100	100,0	
46	Bardejov	49,289	21,274	305	100	100	100	100	100	100,0	
47	Zborov	49,371	21,313	325	P	P	100	100	100	60,0	S
48	Kuková	49,111	21,454	205	N	N	100	100	100	60,0	P+S
49	Čaklov	48,908	21,624	140	100	100	100	100	95	99,0	
50	Somotor	48,396	21,811	100	100	100	100	100	100	100,0	
51	Rožňava	48,649	20,530	289	98	100	100	100	100	99,6	
52	Ratková	48,592	20,100	287	96	100	100	100	100	99,2	
53	Rimavská Sobota	48,374	20,011	215	100	100	100	100	100	100,0	
54	Číž	48,309	20,284	164	100	100	100	100	100	100,0	
55	Moldava n.Bodvou	48,618	21,006	218	100	100	100	97	100	99,4	
56	Silica	48,555	20,527	541	100	95	100	100	100	99,0	
57	Hranovnica	48,988	20,313	607	100	98	100	100	100	99,6	
58	Spišská Nová Ves	48,945	20,558	460	N	N	100	94	100	58,8	P+S
59	Spišské Vlachy	48,955	20,794	388	100	100	100	100	98	99,6	
60	Švedlár	48,799	20,680	550	100	100	100	100	98	99,6	
61	Kysak	48,854	21,221	244	N	N	100	100	100	60,0	P+S
62	Brezovica nad Torysou	49,147	20,861	443	N	N	100	100	100	60,0	P+S
63	Osikov	49,174	21,268	365	N	N	100	96	97	58,6	P+S

Columns 5 -10: Completeness in database in decades 1961 - 1970 (61-70) etc and whole period 1961 - 2010 (61-10)

P - Precipitation only

N - No data

Column 11: To be edited: S - Snow cover, P+S - Precipitation and snow cover

8. Ukraine

PRELIMINARY REPORT
Module 1, Deliverable D 1.6
Report of data inventory
Prepared by: Oleg Skrynyk and Yurii Nabyvanets

Table 1. List of climatological stations with coordinates and decadal completeness of data in database from CARPATCLIM region of Ukraine

0	1	2	3	4	5	6	7	8	9	10
No	STAT NAME	LAT	LONG	ALT	61-70	71-80	81-90	91-00	01-10	61-10
1	Yavoriv	49,9	23,4	254	85	85	85	85	85	85
2	Mostyska	49,8	23,2	232	85	85	85	85	85	85
3	Lviv	49,8	24,1	319	85	85	85	85	85	85
4	Drogobych	49,4	23,5	275	85	85	85	85	85	85
5	Stry	49,3	23,9	294	85	85	85	85	85	85
6	Turka	49,2	23,0	594	85	85	85	85	85	85
7	Slavske	48,9	23,5	592	85	85	85	85	85	85
8	Yampil	49,9	26,2	274	85	85	85	85	85	85
9	Khmelnycky	49,4	26,9	350	85	85	85	85	85	85
10	Kam'yanec-Podilsky	48,7	26,6	217	92	92	92	92	92	92
11	Nova Ushytsya	48,9	27,3	292	92	92	92	92	92	92
12	Ternopil	49,6	25,6	327	85	85	85	85	85	85
13	Berejany	49,4	24,9	303	92	92	92	92	92	92
14	Chortkiv	49,0	25,8	320	85	85	85	85	85	85
15	Dolyna	48,9	24,0	470	92	92	92	92	92	92
16	Ivano-Frankivsk	48,9	24,7	270	85	85	85	85	85	85
17	Kolomyia	48,5	25,0	295	85	85	85	85	85	85
18	Yaremcha	48,5	24,6	531	85	85	85	85	85	85
19	Pojyjevska	48,2	24,5	1451	92	92	92	92	92	92
20	Velyky Berezny	48,9	22,5	205	85	85	85	85	85	85
21	Nyjni Vorota	48,8	23,1	496	85	85	85	85	85	85
22	Play	48,7	23,2	1330	85	85	85	85	85	85
23	Nyjniy Studeny	48,7	23,4	615	85	85	85	85	85	85
24	Ujgorod	48,6	22,3	115	85	85	85	85	85	85
25	Mijgirrya	48,5	23,5	456	92	92	92	92	92	92
26	Beregove	48,2	22,6	113	92	92	92	92	92	92
27	Hust	48,2	23,3	164	92	92	92	92	92	92

28	Rahiv	48,1	24,2	430	85	85	85	85	85	85
29	Chernivtsi	48,3	25,9	242	85	85	85	85	85	85
30	Selyatyn	47,9	25,2	762	85	85	85	85	85	85
Additional stations										
1	Dubno	50,4	25,8	198	85	85	85	85	85	85
2	Rava-Ruska	50,3	23,6	252	85	85	85	85	85	85
3	Kamyanka-Bugska	50,1	24,4	212	85	85	85	85	85	85
4	Brody	50,1	25,2	227	85	85	85	85	85	85
5	Kremenec	50,1	25,7	259	85	85	85	85	85	85
6	Shepetivka	50,2	27,1	277	92	92	92	92	92	92
7	Hmilnyk	49,6	27,9	284	85	85	85	85	85	85
8	Jmerynka	49,0	28,1	313	85	85	85	85	85	85
9	Mogyliv-Podilsky	48,5	27,8	77	85	85	85	85	85	85

Columns 5 -10: Completeness (in %) in database in decades 1961 - 1970 (61-70) etc and whole period 1961 - 2010 (61-10)

Remarks:

- Measurements of Global radiation are not conducted on the Ukrainian stations located in Carpathians area.
- Measurements of Sunshine duration are not conducted on all stations.
- Ukraine has hydrological gauging stations in the region which have data on precipitation. Currently Ukrainian team is studying details, i.e. time series, daily data availability, but it takes time. They will inform CARPATCLIM upon our progress.

Annex 2

Climate of the Carpathian Region - Module 1

D1.6 Report of data inventory of meteorological stations per month to be considered for the service, including the specification of existing data gaps and proposed methodologies to fill them, and of existing analogue datasets to be digitized

Annex 2 - Example of metadata Excel file and information regarding data gaps and existing data sources.

The structure of the current metadata database in Excel Files consists of following metadata profile units, where in ***bold and italic*** are metadata information connected with data gaps and possible data rescue procedures:

Station

NameStation	Station name
NatID	National ID of the station
Country	Country (Country code/abbreviation)
Actual Latitude	Latitude of up to date position station in WGS84 Actual
Longitude	Longitude of up to date position station in WGS84
Actual Altitude	Altitude of up to date position station in meters a.s.l.
NatHyps	National hypsometric system
Basin	Partial basin
StatSurr	Overall character of the surroundings
StationType	Data from station type
StationCat	Station category
BegMonStat	***Beginning of monitoring station***
EndMonStat	***End of monitoring station***
Variables	Yes or No

ChangeStationPosition

NameStation	Station name
NatID	National ID of the station
DateChange	***Date of change***
Original Longitude	Longitude before change position station in WGS84
Original Latitude	Latitude before change position station in WGS84
Original Altitude	Altitude before change position station in meters a.s.l.
New Longitude	Longitude after change position station in WGS84
New Latitude	Latitude after change position station in WGS84
New Altitude	Altitude after change position station in meters a.s.l.
Comment	Comment of the change position

VariablesProperties

NameStation	Station name
NatID	National ID of the station
Variables	Variables name
Paper Sheets Data Start	***Beginning observation variable on the station all available data including paper sheets***
Paper Sheets Data End	***Ending observation variable on the station all available data including paper sheets***
Database Data Start	***Beginning observation variable on the station only data in the database (digitalized data)***
Database Data End	***Ending observation variable on the station only data in the database (digitalized data)***
Database Type Data	Type of data in the database
Completeness	**Yes / No**
Quality Control	Yes / No
Observing Time1	Time of observation in the morning in the mean local time
Observing Time2	Time of observation in the midday in the mean local time
Observing Time3	Time of observation in the evening in the mean local time
Observing Time4	Time of observation in the night (if practiced)in the mean local time
Observing Height	Height of the observing instrument relative to the surface in meters
Observing Instrument	Type of the observing instrument
Observing Type	Data from station type

ChangeVariables

NameStation	Station name
NatID	National ID of the station
Variables	Variables name
Change Type	Type of change
Change Date	***Date of change***
Comment	***Comments on the change***